Final Report

Idaho Dairy Anaerobic Digestion Pilot

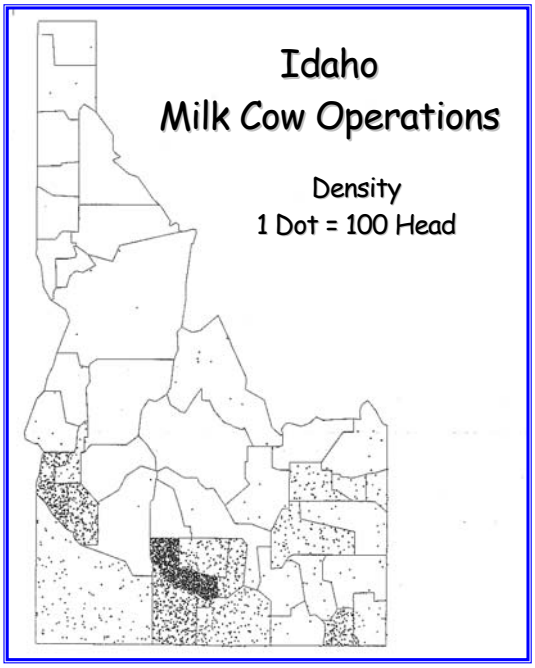
STATE ENERGY PROGRAM SPECIAL PROJECT

Grant No. DE-FG51-01R021290

Idaho Department of Water Resources

Energy Division Bioenergy Project

Idaho is the second largest milk-producing state in the west and ranks fifth nationally. Over half of the dairy farm operations in the state are in the Magic Valley. Many of these dairy farms are large. A 5,000 or larger head dairy is not uncommon in the Idaho. State requires dairies to manage their waste but it is largely untreated and land applied. As a result there is a considerable concern for health, odors and flies.



Beginning in 2000, the Idaho Energy Division launched a five-year effort to educate the dairy and livestock industries on anaerobic digestion (AD) processes and help them incorporate these technologies into their operations. The Energy Division is uniquely qualified to provide leadership and assistance with the AD process. The division works closely with other states through the U.S. Department of Energy's Regional Biomass Energy Program (RBEP). Under this program the Energy Division has access to a wealth of bioenergy resources and the RBEP has been deeply involved with the investigation of AD technologies for many years.

In 1994, the Regional Program began working with an exciting new AD process developed by Cyclus Envirosystems Inc. Through the support of the Regional Program this process, called anoxic gas flotation (AGF), revolutionized the AD process for dairies. It can be used with a flush, scrap or vacuum systems so the dairymen do not need to invest in a new waste collection system, retains bacteria, significantly reducing retention time, and maximizes fuel production.

To assist the dairymen to treat their waste and convert it into a new profit center, the Energy Division devised a two-phase plan. First, it secured a grant from the U.S. Department of Energy to provide outreach and education on anaerobic digestion and develop a thorough design and feasibility analysis and design for a typical dairy installation.

To initiate the effort a partnership of federal, state and local agencies, technology providers, and utility and dairy industry representatives was established to help develop the report. In addition, the Advisory Committee provided expertise in determining how to best optimize the technology's benefits to the dairymen and the community and help develop funding sources for the dairymen.

In conjunction with the first phase of this effort, the Energy Division obtained some additional DOE funding for the second phase of the project. The goal of the second phase of the AD initiative was the installation of the technology into a selected dairy or dairies.

At the completion of the feasibility under Phase I of the project it was clear there were barriers to implementing this technology in the state. Two issues needed to be fully resolved before installing anaerobic digestion in Idaho diaries. The first issue is what to do with the power generated by the process. The most promising avenue for Idaho dairymen to sell power from their anaerobic digester is through the Public Utilities Regulatory Policy Act of 1978 (PURPA). PURPA requires utilities to purchase electric power from "Qualified Facilities (QF)" at the "avoided cost". The Idaho Public Utilities Commission (IPUC) has jurisdiction over all QF contracts within the State of Idaho. They also set what price the utility will pay for the power

(avoided cost). Rules established by the IPUC were not conducive to renewable power generation by independent power producers.

As a result an Independent Power Producers group was formed to push for changes in the IPUC rules so dairymen could obtain a reasonable power sales agreement. In May 2002 the IPUC increased the maximum required power sales contract length from 5 to 20 years. The levelized avoided cost for 20-year contact going on-line in 2006, for all three regulated utilities in Idaho, is now approximately 6.1¢ per kWh.

Avoided cost rates, or the price utilities are forced to purchase, are essentially what they were in the early 1980's. The power contracts, however, are less attractive, and interconnection cost, in both time and money, are much larger.

Although there are problems with utility power contracts and interconnection the process is workable and power rates make many projects financially attractive. Projects can also sell their "environmental benefits", which increases the price paid for the power even further.

The second issue was direct project funding. It was believed that dairymen, particularly on the first installations, needed financial assistance to implement this technology. The Energy Division offered $50,000 to go to first dairy or dairies installations and helped the John Beukers Dairy secure a $500,000 USDA Rural Development grant in 2003. In early 2004, however, Mr. Beukers decided not pursue the project.

In early 2004, the AD Advisory Committee chaired by State Representative Doug Jones of Filer, was able to secure $900,000 of NRCS funding through the EQUIP Program for two demonstration projects. Grant funds were subsequently obligated to the Ledbetter Dairy in the Magic Valley and Stewart Dairies in the Treasure Valley. Both dairies have now put these projects on indefinite hold. This largely foreclosed on further use of EQUIP funds for other dairies to use for AD.

There are no longer major barriers to the installation of digesters in Idaho dairies. Dairymen can sell their power at a relatively attractive rate and government funding, in the one-half million-dollar range, has been made available to most of the handful of dairymen who have requested it. Based on the results of the AD Initiative it appears that dairymen are not likely to incorporate AD in their operations unless renewable energy production has a greater value in the state or they are forced to appropriately treat their waste or both.

Another business plan is to have entities not associated with the dairy build and operate AD installations. Groundbreaking for Idaho's first dairy digester using this arrangement occurred on March 30, 2004. A $.75 million digester project, at the 4,000-head Whitesides Dairy 11 miles northwest of Rupert, was built and being operated by the Idaho Falls-based engineering company Intrepid Technologies. Intrepid announced it had achieved a fully automated operational status on January 25, 2005. Intrepid leases about one-quarter of an acre from the Whitesides for the digester in exchange for providing sufficient gas to the dairy to offset its current propane use. Intrepid owns the AD facility.

In June 2006, the Energy Division agreed to provide Intrepid with $50,000 from the Department of Energy to process the methane gas generated by the digester so it can be sold to Intermountain Gas. Intrepid obtained a 15-year purchase agreement with Intermountain Gas, installed the equipment, and provided the Energy Division with a report analyzing the cost effectiveness of selling the methane to the natural gas utility compared to generating and selling electricity to the electric utility. They also promoted, publicized and provided numerous tours of the facility. In late 2005 Intrepid broke ground on their second facility at the WestPoint Dairy near Wendell.

Anaerobic digestion is a far superior waste treatment method than what is currently being used at Idaho dairies and, at the same time, offers profitable co-products. The question is no longer if AD will become common in Idaho diaries but when.

Project Manager: John Crockett
Idaho Energy Division
322 East Front Street
PO Box 83720
Boise, ID 83720

Tel: 208 287-4894
Fax 208 287-6700
john.crockett@idwr.idaho.gov